

1 **CLAIM LISTING**

2 1. (Currently amended) An electric field proximity keyboard on a substrate,
3 comprising:

4 a plurality of keypads each having an electrode radiating an electric field;
5 a circuit including as follows:

6 a high impedance circuit having a first node and a second node;

7 an AC signal source coupled to the first node;

8 an analog multiplexer having an output coupled to the second node, and
9 having a plurality of inputs wherein each input is coupled to one electrode;

10 a detector circuit generating a DC output based on the voltage difference
11 across the first node and the second node; and

12 a controller coupled to the DC output and the analog multiplexer wherein the
13 controller issues control commands to the analog multiplexer to selectively couple each
14 electrode to the second node for a predetermined time period and to determine whether
15 the DC output indicates a disturbance in the electric field from an object in close
16 proximity or touching the keypad and wherein the object in close proximity or touching
17 each keypad disturbs the electric field attenuating the voltage at the second node and
18 the voltage difference between the first and second nodes indicates the distance of the
19 object to each keypad.

20
21 2. (Canceled)

22
23 3. (Currently amended) The keyboard of claim 1, wherein the plurality of
24 keypads [is] are arranged in ~~an~~ a m x n array with m rows and n columns, wherein each
25 keypad ~~include~~ includes an electrode pair including a row electrode coupled to a row
26 address and a column electrode coupled to a column address, wherein the quantity of
27 keypads is increased by m x n while the I/O addresses are determined by m + n.

1 4. (Currently amended) The keyboard of claim [3] 1, wherein each keypad
2 includes a plurality of ~~electrodes~~ electrode pairs arranged in a m x n array, wherein m
3 rows and n columns of ~~electrodes~~ the electrode pairs are associated with each keypad,
4 wherein each electrode pair includes a row electrode coupled to a row address and a
5 column electrode coupled to a column address, wherein the sensitivity and resolution of
6 [a] each keypad is increased by m x n times.

7
8 5. (Original) The keyboard of claim 1, wherein the controller is programmed
9 to store, adjust and compensate for the shape, size, conductivity, proximity of the object
10 with respect to the plurality of electrodes and environmental conditions.

11
12 6. (Original) The keyboard of claim 1, wherein the circuit is integrated with
13 the controller in a semiconductor IC.

14
15 7. (Canceled)

16
17 8. (Original) The keyboard of claim 3, wherein the circuit is integrated with
18 the controller in a semiconductor IC.

19
20 9. (Original) The keyboard of claim 4, wherein the circuit is integrated with
21 the controller in a semiconductor IC.

22
23 10. (Original) The keyboard of claim 5, wherein the circuit is integrated with
24 the controller in a semiconductor IC.

1 11. (Currently amended) An electric field proximity keyboard on a substrate,
2 comprising:

3 a keypad having an electrode radiating an electric field;

4 a circuit including as follows:

5 a high impedance circuit having a first node and a second node;

6 an AC signal source, wherein the AC signal source is coupled to the first
7 node and the electrode is coupled to the second node;

8 a detector circuit generating a DC output based on the voltage difference
9 across the first node and the second node; and

10 a controller coupled to the DC output wherein the controller determines whether
11 the DC output indicates a disturbance in the electric field from an object in close
12 proximity or touching the keypad and wherein the object in close proximity or touching
13 the keypad disturbs the electric field attenuating the voltage at the second node and the
14 voltage difference between the first and second nodes indicates the distance of the
15 object to the keypad.

16
17 12. (Currently amended) The keyboard of claim 11, wherein one or more of
18 the AC signal source, [a] the high impedance circuit, and the detector circuit are
19 integrated with the controller on a single semiconductor.

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21 13. (Canceled)

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23 14. (Currently amended) The keyboard of claim 11, wherein the controller is
24 programmed to store, adjust and compensate for the shape, size, conductivity, proximity
25 of the object with respect to the ~~plurality of electrodes~~ electrode and environmental
26 conditions.
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1 15. (New) An electric field proximity keyboard on a substrate, comprising:
2 a plurality of keypads each having as follows:
3 an electrode radiating an electric field;
4 a circuit including as follows:
5 a high impedance circuit having a first node and a second node;
6 an AC signal source coupled to the first node;
7 a detector circuit generating a DC output based on the voltage
8 difference across the first node and the second node;
9 an analog multiplexer having an output coupled to the second node, and having
10 a plurality of inputs wherein each input is coupled to one electrode; and
11 a controller coupled to the DC output and the analog multiplexer, wherein the
12 controller issues control commands to the analog multiplexer to selectively couple the
13 electrode to the second node for a predetermined time period and to determine whether
14 the DC output indicates a disturbance in the electric field from an object in close
15 proximity or touching the keypad, wherein the plurality of keypads is arranged in a $m \times n$
16 array with m rows and n columns, wherein each keypad include an electrode pair
17 including a row electrode coupled to a row address and a column electrode coupled to a
18 column address, wherein the quantity of keypads is increased by $m \times n$ while the I/O
19 addresses are determined by $m + n$.

20
21 16. (New) The keyboard of claim 15, wherein each keypad includes a plurality
22 of electrode pairs arranged in a $m \times n$ array, wherein each electrode pair includes a row
23 electrode coupled to a row address and a column electrode coupled to a column
24 address, wherein the sensitivity and resolution of each keypad is increased by $m \times n$
25 times.

26
27 17. (New) The keyboard of claim 15, wherein the controller is programmed to
28 store, adjust and compensate for the shape, size, conductivity, proximity of the object
29 with respect to the electrode pairs and environmental conditions.

1 18. (New) The keyboard of claim 15, wherein the circuit is integrated with the
2 controller in a semiconductor IC.

3
4 19. (New) The keyboard of claim 16, wherein the controller is programmed to
5 store, adjust and compensate for the shape, size, conductivity, proximity of the object
6 with respect to the plurality of electrodes pairs and environmental conditions.

7
8 20. (New) The keyboard of claim 16, wherein the circuit is integrated with the
9 controller in a semiconductor IC.

10
11 21. (New) The keyboard of claim 17, wherein the circuit is integrated with the
12 controller in a semiconductor IC.

13
14 22. (New) The keyboard of claim 19, wherein the circuit is integrated with the
15 controller in a semiconductor IC.